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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>C11D 1/835</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/58429</b> <b>(43) International Publication Date:</b> 5 October 2000 (05.10.00)
<b>(21) International Application Number:</b> PCT/US00/06425 <b>(22) International Filing Date:</b> 23 March 2000 (23.03.00) <b>(30) Priority Data:</b> 09/277,397 26 March 1999 (26.03.99) US <b>(71) Applicant:</b> COGNIS CORPORATION [US/US]; Suite 200, 2500 Renaissance Boulevard, Gulph Mills, PA 19406 (US). <b>(72) Inventor:</b> LAZAROWITZ, Virginia; 103 Kimberly Way, Hatfield, PA 19440 (US). <b>(74) Agent:</b> TRZASKA, Steven, J.; Cognis Corporation, Suite 200, 2500 Renaissance Boulevard, Gulph Mills, PA 19406 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> USE OF AN ALKYL POLYGLYCOSIDE TO ENHANCE THE PERFORMANCE OF A CATIONIC FABRIC CARE PRODUCT  <b>(57) Abstract</b>  A softening and antistatic composition containing: (a) an alkyl polyglycoside; and (b) an ester quat, wherein (a) and (b) are present in the composition in a ratio by weight of from about 1:3 to about 1:10.		

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USE OF AN ALKYL POLYGLYCOSIDE TO ENHANCE THE  
PERFORMANCE OF A CATIONIC FABRIC CARE PRODUCT

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BACKGROUND OF THE INVENTION:

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Cationic surfactants are widely used in acidic aqueous and nonaqueous systems as textile softeners, dispersants, emulsifiers, wetting agents, sanitizers, dye-fixing agents, foam stabilizers and corrosion inhibitors. To some extent, the usage pattern mirrors that of anionic surfactants in neutral and alkaline solutions.

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Positively charged cationic surfactants are adsorbed more strongly than nonionic surfactants on a variety of substrates including textiles, metals, glass, plastics, minerals and animal and human tissue, all of which often carry a negative surface charge. The substantivity of cationic surfactants is the key property in many applications in which they are uniquely effective.

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The quaternary ammonium ion is a much stronger hydrophile than a primary, secondary or tertiary amino group and is strong enough to carry into solution a hydrophobe in the surfactant molecular weight range, even in alkaline media. The discreet positive charge on the quaternary ammonium ion promotes strong adsorption on negatively charged substrates, such as fabrics, and is the basis for the wide-spread use of the surfactants in domestic fabric-softening compositions.

While the use of cationic surfactants has been shown

to impart adequate softening and antistatic properties onto textile substrates treated therewith, there is a continuing need to further increase the effectiveness of these compounds.

# BRIEF SUMMARY OF THE INVENTION:

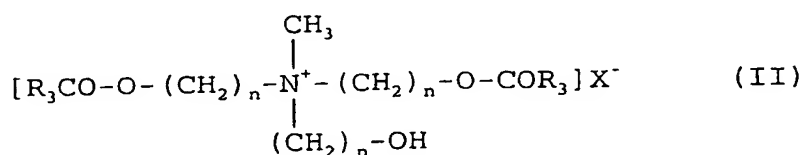
The present invention is directed to a softening and antistatic composition containing:

(a) an alkyl polyglycoside corresponding to formula I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6; and

(b) an ester quat corresponding to formula II:



wherein  $R_3CO$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2 or 3, and  $X$  is a halide, methosulfate or methophosphate ion, and wherein (a) and (b) are present in the composition in a ratio by weight of from about 1:3 to about 1:10.

The present invention is also directed to a process

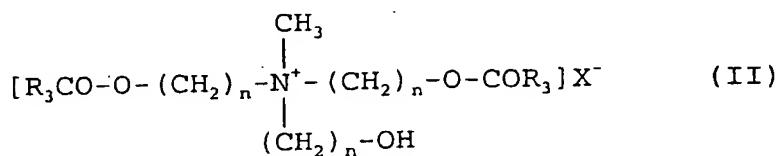
for increasing the softening and antistatic properties of an ester quat involving:

- (a) providing an alkyl polyglycoside corresponding to formula I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6;

- (b) providing an ester quat corresponding to formula II:



wherein  $R_3CO$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2 or 3, and  $X$  is a halide, methosulfate or methophosphate ion; and

- (c) combining (a) and (b) in a ratio by weight of from about 1:3 to about 1:10.

#### DETAILED DESCRIPTION OF THE INVENTION:

Other than in the operating examples, or where otherwise indicated, all numbers expressing quantities of ingredients and reaction conditions are to be understood as being modified in all instances by the term "about".

The present invention is directed to the surprising discovery that by combining an ester quat with an alkyl polyglycoside, in a specific ratio by weight, a synergistic increase in softening and antistatic properties of the ester quat is realized.

The alkyl polyglycosides which can be used in the invention are those corresponding to formula I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6. Preferred alkyl polyglycosides which can be used in the compositions according to the invention have the formula I wherein  $Z$  is a glucose residue and  $b$  is zero. Such alkyl polyglycosides are commercially available, for example, as APG®, GLUCOPON®, PLANTAREN® or AGRIMUL® surfactants from Henkel Corporation, Ambler, PA, 19002. Examples of such surfactants include but are not limited to:

1. GLUCOPON® 220 Surfactant - an alkyl polyglycoside in which the alkyl group contains 8 to 10 carbon atoms and having an average degree of polymerization of 1.5.
2. GLUCOPON® 225 Surfactant - an alkyl polyglycoside in which the alkyl group contains 8 to 10 carbon atoms and having an average degree of polymerization of 1.7.
3. GLUCOPON® 600 Surfactant - an alkyl polyglycoside in

which the alkyl group contains 12 to 16 carbon atoms and having an average degree of polymerization of 1.4.

4. GLUCOPON® 625 Surfactant - an alkyl polyglycoside in which the alkyl group contains 12 to 16 carbon atoms and having an average degree of polymerization of 1.4.

5. APG® 325 Surfactant - an alkyl polyglycoside in which the alkyl group contains 9 to 11 carbon atoms and having an average degree of polymerization of 1.6.

10 6. PLANTAREN® 2000 Surfactant - an alkyl polyglycoside in which the alkyl group contains 8 to 16 carbon atoms and having an average degree of polymerization of 1.4.

7. PLANTAREN® 1300 Surfactant - an alkyl polyglycoside in which the alkyl group contains 12 to 16 carbon atoms and having an average degree of polymerization of 1.6.

8. AGRIMUL® PG 2067 Surfactant - an alkyl polyglycoside in which the alkyl group contains 8 to 10 carbon atoms and having an average degree of polymerization of 1.7.

Other examples include alkyl polyglycoside surfactant compositions which are comprised of mixtures of compounds of formula I as described in U.S. patents 5,266,690 and 5,449,763, the entire contents of both of which are incorporated herein by reference.

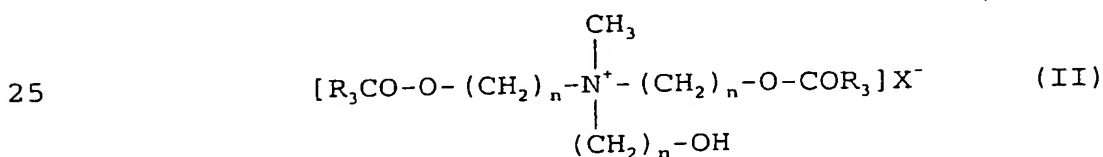
A particularly preferred alkyl polyglycoside for use in the present invention is one corresponding to formula I wherein  $R_1$  is a monovalent organic radical having from about 8 to about 16 carbon atoms, b is zero, and a is a number having a value of from about 1 to about 2.

Ester quats are understood as being technical

quaternized difatty acid trialkanolamine ester salts which may be obtained by the relevant methods of preparative organic chemistry. Methods of their preparation include the esterification of fatty acids with a trialkanolamine such as triethanolamine or tripropanolamine. The difatty acid ester thus formed can then be quaternized in known manner with, for example, methyl chloride or dimethyl sulfate.

Examples of suitable fatty acids from which the ester quats may be derived include, but are not limited to, caprioc acid, caprylic acid, capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, elaidic acid, petroselic acid, linoleic acid, linolenic acid, arachic acid, gadoleic acid, behenic acid and erucic acid, as well as technical mixtures thereof such as, for example, the hydrogenation of vegetable oils or animal fats.

The ester quats which can be used in the present invention are those corresponding to formula II:



wherein  $\text{R}_3\text{CO}$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2 or 3, and  $\text{X}$  is a halide, methosulfate or methophosphate ion.

According to one embodiment of the present



invention, there is provided a softening and antistatic composition containing:

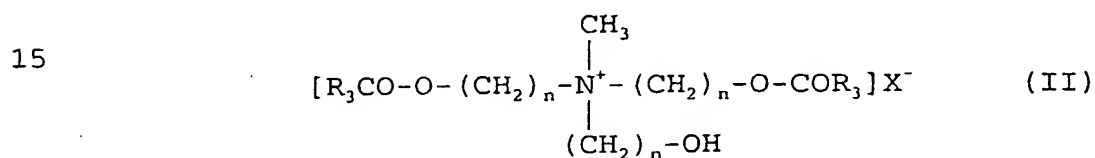
(a) an alkyl polyglycoside corresponding to formula

5 I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms; Z is a  
10 saccharide residue having 5 or 6 carbon atoms; b is a number having a value from 0 to about 12; a is a number having a value from 1 to about 6; and

(b) an ester quat corresponding to formula II:

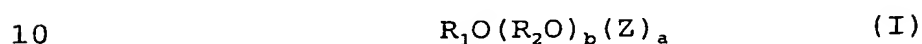


20 wherein  $R_3CO$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds, n is 2 or 3, and X is a halide, methosulfate or methophosphate ion, and wherein (a) and (b) are present in the composition in a ratio by weight of from about 1:3  
25 to about 1:10, preferably from about 1:4 to about 1:6, and most preferably about 1:5.

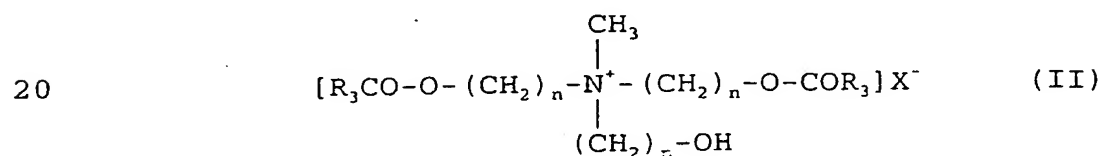
The above-disclosed softening and antistatic composition may be employed in a variety of cleaning compositions such as powdered or liquid light-duty and  
30 heavy-duty laundry detergents, personal cleansing compositions, hard surface cleaners, fabric softening agents, and the like. The precise amount of softening

and antistatic composition present in each cleaning composition will be determined by the formulator, depending on the product's application.

5 According to another embodiment of the present invention, there is also provided a process for increasing the softening and antistatic properties of an ester quat involving: (a) providing an alkyl polyglycoside corresponding to formula I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6; (b) providing an ester quat corresponding to formula II:



wherein  $R_3\text{CO}$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2 or 3, and  $X$  is a halide, methosulfate or methophosphate ion; and (c) combining (a) and (b) in a ratio by weight of from about 1:3 to about 1:10, preferably from about 1:4 to about 1:6, and most preferably about 1:5.

The present invention will be better understood from the examples which follow, all of which are intended for

illustrative purposes only, and are not meant to unduly limit the scope of the invention in any way.

#### EXAMPLES

5 Cotton towels were rinsed in a solution of esterquat, and a mixture of esterquat and alkyl polyglycoside. A panel of 25 panelists judged towels rinsed in both solutions, for softness. The towels rinsed in the esterquat/alkyl polyglycoside solution were  
10 judged to be softer by approximately 80% of the panelists, as compared to those towels rinsed in esterquat alone.

The towels were then tested to determine their static using a Faraday Cage. Those towels rinsed in  
15 esterquat alone were found to reduce about 80% static. However, those towels rinsed in the esterquat/alkyl polyglycoside mixture were found to reduce about 90% static.

Hence, it is surprisingly seen that by employing a  
20 mixture of esterquat and alkyl polyglycoside, in the disclosed ratios by weight, significant improvement in both softness and static reduction is realized.

## WHAT IS CLAIMED IS:

1. A softening and antistatic composition comprising:

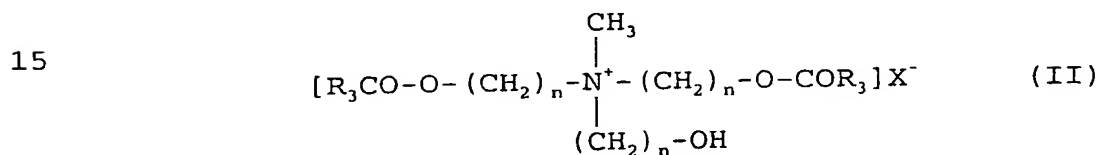
(a) an alkyl polyglycoside corresponding to formula

5 I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a  
 10 saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6; and

(b) an ester quat corresponding to formula II:



20 wherein  $R_3CO$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2 or 3, and  $X$  is a halide, methosulfate or methophosphate ion, and wherein (a) and (b) are present in the composition in a ratio by weight of from about 1:3  
 25 to about 1:10.

2. The composition of claim 1 wherein in formula I,  $R_1$  is a monovalent organic radical having from about 8 to about 16 carbon atoms,  $b$  is zero, and  $a$  is a number having a value of from about 1 to about 2.

30 3. The composition of claim 1 wherein (a) and (b) are present in the composition in a ratio by weight of about 1:5.

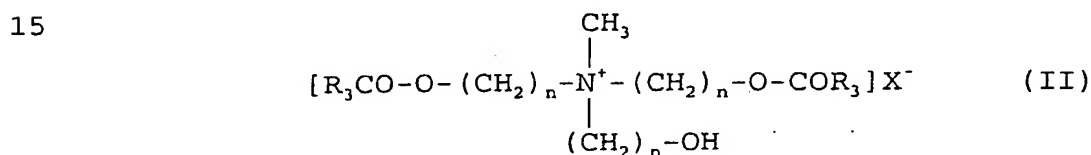
4. A process for increasing softening and antistatic properties of an ester quat involving:

5 (a) providing an alkyl polyglycoside corresponding to formula I:



wherein  $R_1$  is a monovalent organic radical having from about 6 to about 30 carbon atoms;  $R_2$  is a divalent alkylene radical having from 2 to 4 carbon atoms;  $Z$  is a  
10 saccharide residue having 5 or 6 carbon atoms;  $b$  is a number having a value from 0 to about 12;  $a$  is a number having a value from 1 to about 6;

(b) providing an ester quat corresponding to formula II:



wherein  $R_3CO$  is an aliphatic acyl radical containing from about 12 to about 22 carbon atoms and up to 3 double bonds,  $n$  is 2, or 3, and  $X$  is a halide, methosulfate or methophosphate ion; and

25 (c) combining (a) and (b) in a ratio by weight of from about 1:3 to about 1:10.

5. The process of claim 4 wherein in formula I,  $R_1$  is a monovalent organic radical having from about 8 to about 16 carbon atoms,  $b$  is zero, and  $a$  is a number having a  
30 value of from about 1 to about 2.

6. The process of claim 4 wherein (a) and (b) are present in the composition in a ratio by weight of about

1:5.

7. A cleaning composition containing the softening and antistatic composition of claim 1.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/06425

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :C11D 1/835

US CL :510/470, 504

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 510/470, 504

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,627,144 A (URFER et al.) 06 May 1977, column 4, lines 13-30, column 1, line 55-column 2, line 24, column 5, lines 41-45, column 3, line 65-column 4, line 12.	1-7
X	DE 19629666 A1 (HENKEL) 23 July 1996, Example 2.	1-7
X	EP 872541 A2 (HENKEL) 08 April 1998, Example V1.	1, 2, 4, 5, 7

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search

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